Fachpraktikum Interaktive Systeme (SS 2021) "Machine Learning and Computer Vision for HCI"

Introduction

Machine learning and computer vision are becoming increasingly important to enable, support, and improve interactions between humans and machines. In particular machine understanding of human behavior and cognition has significant potential for a new generation of intelligent user interfaces that offer human-like interactive, social, and conversational capabilities.

Learning outcomes

The goal of this Fachpraktikum is to familiarize students with exciting current research topics at the intersection of machine learning, computer vision and human-computer interaction. After having completed the Fachpraktikum, students will have acquired theoretical knowledge about the most important problems in machine understanding of human behavior and cognition and how to leverage such understanding in the design of intelligent user interfaces. The core competency acquired through this course is the ability to implement latest machine learning methods (e.g. deep convolutional and recurrent neural networks, transformer architectures, GANs) that address the processing and interpretation of human input in computing systems and evaluate them on state-of-the-art datasets.

Implementation

Students will work in groups of two on projects with different modalities like images, natural language or gaze. Students will learn how to implement and train models using machine learning Python libraries and how to validate and evaluate these models on benchmark datasets. In their projects, students will go through the whole development cycle: • Exploration of different use cases • Data processing to train machine learning models • Implementation of a neural network architecture • Model training using the processed data • Validation and analysis of the trained model • Presentation of methods, experiments, and results • Write a short paper summarizing the project. Attendance in the weekly meetings is mandatory. **Available space: max 20 students. Language: English.**

Requirements

This Fachpraktikum is intended for **Master students** in Computer Science, Computational Linguistics, Visual Computing, and INFOTECH. Students need to have a **solid understanding of machine learning, and/or computer vision**. **Prior attendance of lectures in these areas is required**. **Prior experience with Python is highly recommended.**

Contact

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